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How Do Institutional Investors Trade When Firms Buy Back Their Shares?

Sheng HUANG
Singapore Management University, shenghuang@smu.edu.sg

Zhe (Joe) ZHANG
Singapore Management University, joezhang@smu.edu.sg

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Sheng Huang

Singapore Management University

Zhe Zhang

Singapore Management University

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Abstract

We study how institutional investors trade when firms buy back shares. We find that institutions sell following share repurchase announcements. The institutional sell-off results in a more concentrated ownership by institutions, as the number of institutions in the investor base declines after accounting for the change in the universe of institutions. While some institutions sell shares passively to meet the firm demand for the market to clear, the overall institutional sell-off only accounts for 27% of shares bought back contemporaneously by firms. Many firms experience a net inflow of institutional investment. The institutional sell-off is greater in firms that experience weaker recent stock performance, display more information uncertainty, have higher institutional ownership, and conduct ill-timed/motivated repurchases that are not endorsed by institutions. And most of the sell-off comes from institutions active in trading. We decompose the future returns of institutional trading into liquidity provision and information components, and find that the returns are attributed solely to information. Institutional buying is more informative of the future returns than institutional sell-off, especially in firms with greater information asymmetry. But this return predictability decays over time. Our findings have important implications for firms' cash payout policy and shed light on institutional trading behavior around voluntary corporate events.

1. Introduction

Share repurchases have been increasingly become a dominant payout mode over dividends (Grullon and Michaely, 2002; and Skinner, 2008). In this paper we investigate how institutional investors trade when firms repurchase their shares on the open market. Through this study, we attempt to better understand why firms buy back shares and increasingly do so, the role of institutional investors in the firms' buyback programs, and how informed institutional investors are in complex informational environments.

First, most of the existing studies try to explain the share repurchase decision from a firm's standpoint of view.[1] Few examines how investors respond specifically to the firm' repurchase decision (except for the aggregate response in stock returns over the short- and long-run), and how the investor response, in return, may affect the effectiveness of the repurchase in fulfilling the firm's strategic purpose. For instance, the literature has long suggested that management may prefer a shareholder base with more long-term investors who are less likely to distract management from long-horizon initiatives. Share repurchases thus can be used strategically to facilitate a favorable change in investor base for management. Huang and Thakor (2012) argue that firms repurchase to buy out investors that disagree with management on investment decisions, and thus concentrate the firms' ownership in the hands of those investors whose beliefs are more aligned with management. It would therefore be interesting to examine how investors trade and document the change in the investor base when firms are buying back shares.

Second, while the literature has documented the role of institutional investors and highlighted their superior information production ability in corporate events such as IPOs and SEOs, documenting institutional trading in share repurchases is of interest on its own right. On the one hand, unlike dividend payout, repurchases involve a wealth transfer between tendering and withholding shareholders, as informed shareholders are able to exploit uninformed others by either withholding undervalued shares or selling overvalued

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[1] The literature has identified that repurchases can be used to exploit the undervaluation in timing the market (Ikenberry, Lakonishok, and Vermaelen, 1995), deter a takeover attempt (Bagwell, 1991), to offset dilution from stock options (Fenn and Liang, 2001; and Kahle, 2002), to pay out temporary cash flows (Guay and Harford, 2000; and Jagannathan, Stephens, and Weisbach, 2000), to inflate earnings-per-share especially when it may otherwise fall short of the analysts' forecast (Hribar, Jenkins, and Johnson, 2006), or they can be a strategic response to a rival firm's repurchase decision (Massa, Rehman, and Vermaelen, 2007).

shares (Brennan and Thakor, 1990); hence it would impose the security valuation costs on shareholders. Institutional investors typically hold the majority of the shares, and they arguably have better access to information and can process information less costly, and thus are at advantage in share repurchases relative to individual investors. On the other hand, we note that informational environments may be very complex around share repurchases even for professional investors. While a tender-offer repurchase usually signals a firm's undervaluation, it is not always so for an open-market repurchase (OMR hereinafter).[2] Using an exogenous measure of stock mispricing due to flow-driven buying/selling pressure by mutual funds, Khan, Kogan, and Serafein (forthcoming) find that firms clearly time the market in equity issuance when their shares are overvalued, but do not do so in share repurchases when their shares are undervalued. In practice, there is abundant evidence suggesting that managers often have timed the market poorly in repurchase decisions (see, e.g., DeAngelo, DeAngelo, and Skinner, 2008; and Jiang and Koller, 2011). Hence, it is more demanding for investors to discern any arbitrage opportunity in share repurchases when it is less clear whether market mispricing takes place. Moreover, even some sophisticated market participants like analysts can get it persistently wrong on repurchasing firms' valuation. Peyer and Vermaelen (2009) show that analysts' earnings forecasts are too pessimistic before repurchases and analysts do not change their minds as a results of the buyback announcements. Therefore, it would be interesting to examine whether and how institutions, especially those active in trading, read through the value implications of firm repurchase decisions.

We empirically examine these issues by investigating institutional trading upon open-market repurchase announcements and up to two subsequent quarters, a quarterly window (0, 2), between 1985 and 2008. We focus on this relatively short-period window out of two considerations. First, institutional trading over a long period may be noisy in capturing its informativeness. Second, while firms could span the execution of their announced open-market repurchase programs over a period of one to three years, actual repurchases typically follow soon after the announcements (Lie, 2005). To account for any other factors than repurchases that potentially affect institutional trading, we contrast institutional

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[2] See related discussions by Comment and Jarrell (1991) and Huang and Thakor (2012).

trading of sample firms with contemporaneous institutional trading of a control sample of non-repurchasing firms with similar characteristics such as market capitalizations, book-to-market, prior stock returns, and past institutional ownership and trading.

Our analysis using quarterly institutional ownership data (13F) yields interesting findings of institutional investor behavior. We find a sell-off by institutions during our examination quarterly window (t, t+2), and most of the sell-off takes place in the announcement quarter t. Institutions thus appear not concerned with the long-run positive price drift in repurchasing firms documented earlier in the literature (e.g., Ikenberry, Lakonishok, and Vermaelen, 1995; Peyer and Vermaelen, 2009). On average, institutions sell about 2% of their total holdings. And the decline in institutional ownership is not explained by other firm characteristics or the general market trend in institutional trading, as institutions in control firms increase their holdings persistently during the same time window.

The quarterly ownership data cannot identify the exact date of trading. To address this concern, we make use of a sample of transaction-level institutional trading data which helps to delineate institutional trading before the announcement from that after the announcement. We find that the institutional sell-off in the announcement quarter takes place after the announcement and is concentrated in days immediately following the announcement.

There is a great heterogeneity in trading behavior across different types of institutions. We find that institutions that are active in trading (such as independent investment companies and investment advisors) react more quickly to repurchase announcements than those that are typically passive in trading (such as banks and insurance companies). The sell-off by active institutions in the announcement quarter accounts for the majority of the trading by institutions. And the sell-off does not continue into, nor does it get reversed in the two subsequent quarters. In contrast, passive institutions seem to smooth their selling during the examination window while they barely change their ownership in the control firms at the same time.

Institutional selling leads to a change in the investor base of repurchasing firms. We find that institutions supply a modest portion of shares (27%) actually bought back by firms contemporaneously. It implies an overall increase in institutional ownership *ex post*. We further explore the extent to which the ownership concentration changes as a result of institutional trading and firm buybacks. After accounting for the change in the universe of institutions, we find that the number of institutions in the investor base declines in the two quarters (t, t+2). This decline is in sharp contrast with the general trend of an increase in the number of institutions prior to repurchases. This finding is possibly explained by Huang and Thakor (2012) that firms initiate repurchases to buy out investors whose beliefs are not so well aligned with management. Consistent with this, we find that the decline in the number of institutions is more pronounced for active institutions. Unlike passive institutions who are likely to have business ties with repurchasing firms and thus may not sell even if they disagree with management, active institutions are more likely to "vote with feet" when they disagree.

We investigate why institutions sell their holdings in addition to the disagreement story above. First, institutions selling shares may be simply providing shares for the market to clear, especially when there is a large share demand from the firms and the trading costs are low. We find that they do sell more when firms announce larger repurchase programs and when the firms' shares are more liquid. But this liquidity provision story is incomplete in explaining the sell-off as institutions supply only 27% of shares actually repurchased as discussed earlier. Second, we examine whether institutions trade on momentum. Consistent with momentum trading, the overall decline in institutional ownership is greater in firms with lower prior stock returns. This trading pattern is more pronounced with passive institutions. However, momentum trading cannot fully explain the change in institutional ownership because the magnitude of the abnormal sell-off is greater than that of the raw sell-off. Third, given that repurchase announcement returns are typically positive, the institutional selling appears to be consistent with profit taking. This return-contrarian manner of institutional trading may slow down the price adjustment and contributes to the post-repurchase price drift. But institutions appear to sell for reasons beyond profit-taking per se, because we find no evidence that they sell more upon higher announcement returns.

Fourth, Brennan and Thakor (1990) suggest that uninformed shareholders will never tender their shares in open-market repurchases if informed ownership is sufficiently high. We thus test if institutions as informed investors sell more in firms with higher prior institutional ownership. Our finding confirms this prediction. Fifth, we show above that institutions disproportionally sell less relative to individual investors, suggesting that some institutions are actively buying upon the news. Since the repurchase announcement is a noisy signal of the firm value, the cost of trading and arbitrage is higher when investors face higher information uncertainty. We hence expect less buying and more net selling for firms with more uncertain information environment. We show evidence consistent with this prediction.

Furthermore, some repurchases may have been ill timed and thus institutions are more likely to sell their shares. Firms could be buying back shares when their shares are highly valued, or they could fail to build a cash cushion against slowdown in growth while spending heavily on repurchases. We find that institutions sell significantly more upon repurchase announcements if the repurchases are poorly timed. This pattern is more pronounced for the period of 1998-1999, when there is a spike in repurchases before the burst of the high-tech bubble and most firms' valuations are not low. Consistent with the poorer repurchase timing, in the year subsequent to repurchase announcements, firms with top tercile of prior institutional trading underperform by 5.27% in stock returns compared to those with bottom tercile of prior institutional trading.

Lastly, there is evidence that institutions are informed in their trading. We decompose the future returns of institutional trading into information and liquidity provision components, and find that the future returns are attributed solely to information. Stock purchases are more informative about future returns than stock selling by institutions. Firms with the most increase in institutional ownership significantly outperform their matched counterparties over the following year, while firms with the most decrease in institutional ownership do not outperform or even underperform. Yet, the return predictability is limited to trading by active institutions, and it decays over a longer time period. Taken together with passive institutions' smooth trading which is aligned with the

typical pace of firm buybacks on the open market over time,[3] we conclude that trading by passive institutions mostly serves the purpose of liquidity provision. Consistent with its informativeness, we find that active institutional trading has better return predictability in small and growth firms and in firms that have experienced poorer stock returns prior to repurchases.

The contributions of our study are mainly two-fold. First, we extend the share repurchase literature by showing how institutional investors trade while firms are buying back shares. Grinstein and Michaely (2005) examine how institutional ownership is related to a firm's repurchase policy using yearly data. While they look at how institutions trade in the year after repurchases, our study focuses on how institutions react to repurchase announcements and trade when firms are buying back shares. The shorter time window enables us to capture the informativeness and other motives of institutional trading than the longer-term clientele effect of repurchases as suggested by their finding. Moreoverour sample is the most comprehensive to date spanning the period of 1985-2008 and captures the spikes in repurchases in the last 15 years. Our study also helps better understand how firms may realize their strategic goals through share repurchases and why repurchases have been increasingly popular over time. For instance, while we do not explore the causality here, the increasing popularity of repurchases is not simply coincident with the general increase in institutional ownership, but may rather be related to firms' incentives to optimize their ownership structure through repurchases.

Second, our study provides some new insights about institutional trading around corporate events, and helps to further our understanding of institution behavior. Using the unique setting of share repurchases, we analyze different aspects of institutional trading such as providing liquidity, arbitraging in the presence of anomaly, discerning ill/good managerial initiatives, and exploiting their informational advantages. While most studies in this area focus on the informativeness of institutional trading, we decompose the future returns of institutional trading into information and liquidity provision components.

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[3] In accelerated repurchase programs, firms typically accumulate all required shares in a short time period. However, this type of intensive repurchase program only emerges and gets more attention in the last several years. The aggregate magnitude of accelerated repurchases is small, compared with that of open-market repurchases. For a detailed study of accelerated repurchases, see Bargeron, Kulchania, and Thomas (2011). We do not include accelerated repurchases in this study.

For the rest of the paper, we proceed as follows. In Section 2, we discuss data, sample selection, and construction of matched firms. We then present our main findings and discussions of institutional trading in Section 3. Section 4 concludes.

2. Data and Methodology

2.1. Data description

Our data come from several sources. Our initial sample of repurchases, obtained from Securities Data Company's (SDC) U.S. database, contains all open-market share repurchases announced during the period from 1985 to 2008. Repurchases by tender offers or privately negotiation are excluded. We drop those repurchases with program size smaller than 1% of the firm's market capitalization as of the prior fiscal year end. If there're multiple announcements during a year, we only include the first one.

The quarterly institutional ownership data is from CDA/Spectrum provided by Thomson Financial. The Security and Exchanges Commission (SEC) requires that all institutional managers with $100 million or more in assets under management report equity positions over 10,000 shares or $200,000 in their quarterly 13F filings. We calculate the quarterly institutional percentage ownership for each stock as the ratio of the number of shares held by all 13F institutions at the end of each quarter and the total number of shares outstanding. Institutional trading for any given period is then defined as the difference between the percentage ownership at the end of the current and the previous period.

Besides examining the aggregate institutional ownership and trading, we also report results for different types of institutions. The CDA/Spectrum classifies institutions into five types: type 1 (banks), type 2 (insurance companies), type 3 (investment companies), type 4 (independent investment advisors), and type 5 (ESOPs, university endowments, foundations, and private and public pension funds). Chen, Hartford, and Li (2007) point out that CDA/Spectrum's type classification is not accurate beyond 1998 due to a mapping error. Many of the institutions are improperly classified as type 5 institutions. For institutions that existed before 1998, we follow Chen, Hartford, and Li (2007) and apply the

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institutions' pre-1998 CDA classification to their post-1998 classification. For institutions appear in 1998 and after, we manually identify their CDA classification and group them accordingly. We then regroup type 1 and type2 institutions as passive institutions (recoded as type 1 institutions), and type 3 and type 4 as active institutions (recoded as type 2 institutions), as similarly done in Almazan, Hartzell, and Starks (2005) and Chen, Hartford, and Li (2007), among others. Because there is a mix of active and passive institutions within type 5, we take the conservative approach and group them separately as other institutions (recoded as type 3 institutions).

Monthly and daily stock returns, share prices, and stock turnover data are from the Center for research in Security Prices (CRSP). Book value of equity, the SIC two-digit industry classification and other firm characteristics are from COMPUSTAT. The data on the number of the analyst forecasts is from I/B/E/S. Our main sample period spans from January 1985 to December 2008.

In part of our analysis we also examine institutional trading at the daily horizon. We obtain intro-daily institutional trades from Ancerno, a well-known consulting firm and data provider (spun off from Abel/Noser Corp). Ancerno provides complete transaction history of their institutional clients. For our purposes, each day we aggregate all institutional trades for a stock (net of buy and sell), and calculate the daily institutional trading as the ratio of the total number of shares traded during the day and the total number of shares outstanding. Our daily sample spans from January 1999 to December 2008.

2.2. Construction of matching firms

Our main goal is to study institutions' reaction to repurchase announcements and how they trade when firms are buying back shares. One may argue that a firm's repurchase decision may be a response to a decline in institutional ownership. Thus, institutions' post-announcement trading may be affected by their pre-announcement trading. Further, a firm's repurchase decision comes as a result of other factors which may also be related with institutions' post-announcement trading. To address this issue, for each repurchasing firm in our sample, we find a matching firm that share similar prior institutional ownership structure and other firm characteristics, but does not make repurchase announcements

during any time around the sample event date. We then contrast post-announcement institutional trading of sample firms with that of the matching firms. A similar approach can be seen in Parrino, Sias, and Starks (2003).

Specifically, to account for multiple factors that may affect the repurchase decision, we adopt a propensity score approach. We first run the following pooled logistic regression using all firms in the 13F institutional dataset that have one-quarter-lagged data on the market capitalization, past 12-month return, book-to-market ratio, and institutional holdings available for the past four quarters:

$$buy\_back_t = mktcap_{t-1} + bm_{t-1} + r_{12,t-1} + Hld_{t-1} + Hld_{t-2} + Hld_{t-3} + Hld_{t-4}, \quad (1)$$

where buy_back_t equals one if the firm has a repurchase announcement in quarter t, and zero otherwise. $mktcap_{t-1}$, bm_{t-1}, and $r_{12,t-1}$ are the firm's market capitalization, book-to-market ratio, and past 12-month return, as available at the end of quarter t-1. Hld_{t-4} to Hld_{t-1} are the percentage institutional ownership at the end of quarters t-4 to t-1, respectively. Since repurchases mechanically change the number of shares outstanding, we use the four-quarter-lagged total number of shares outstanding as the common scalar when calculating percentage ownership for all periods from quarter t-4 to quarter t+2. By doing this, in our examination of the impact of repurchases on institutional ownership later, we are able to gauge the change in institutional ownership brought solely by institutions' trading. Such a measure will not be affected by the otherwise mechanical change in the denominator (the total number of shares outstanding).

We define the predicted value of the above regression as the repurchase propensity score for each firm in quarter t. We then find a matching firm that has the closest propensity score as the sample firm in the same quarter, which shares the same 2-digit SIC code and does not announce repurchases in quarter t, or within two years before or after quarter t. Our final sample contains 10119 open-market repurchase announcements for each of which a matching firm is available.

Panel A of *Table 1* reports the summery statistics of sample firms and matching firms. The mean (median) book-to-market ratio for the sample firms is 0.66 (0.54), as opposed to

0.67 (0.53) for the matched firms. The average past 12-month return for sample (matched) firms is 14% (15%), while the median is much smaller at 4% (5%). The differences of the book-to-market ratio and the past returns between sample and matched firms are statistically insignificant, respectively. The difference of the average firm size as measured by a natural logarithm of the market capitalizations (in $millions) between the two firm groups is small, 5.97 for sample firms vs. 5.58 for matched firms, despite being statistically significant. Sample firms have almost identical institutional holdings as matched firms in the four quarters prior to repurchase announcements, with the largest difference being only about 0.5% in quarter t-3. In sum, sample firms and their matched counterparts share very similar characteristics in general, which validates the selection of the matched firms as good controls. Consistent with the findings in earlier literature, the average (median) announced repurchase program size amounts to 8% (6%) of the firms' market capitalizations as of the prior fiscal year end. And the average (median) five-day (-2, +2) cumulative abnormal return (CAR) around repurchase announcements is 3% (2%).

Panel B of *Table 1* reports institutional trading in the last four quarters as well as in the last quarter prior to repurchase announcements. Institutions in sample firms, on average, increase their holdings prior to repurchase announcements by 2.4% for the period from quarter t-4 to t-1. The increase in institutional ownership persists (increase by 0.6%) during quarter t-1 even when it is close to the announcements. The increase is observed in holdings by all three types of institutions, while about three quarters of it comes from active institutions. By design, there's little difference in the change in institutional ownership between sample and matched firms, reflecting their similar levels of institutional ownership in each of the four quarters as shown in Panel A.

Given the fact that there is a general trend of institutional ownership increase over the sample period, we wonder how typical the increase in institutional ownership in our sample and matched firms is. For each sample quarter, we construct an alternative institutional trading benchmark, defined as the average institutional trading in that quarter across all firms that are included in the 13F filings. Compared with this benchmark, we find that the average increase in institutional ownership in the sample (and matched) firms is

higher. The abnormal institutional trading is 1.5% from quarter t-4 to quarter t-1, and 0.27% for quarter t-1 alone. Again, active institutions account for the bulk of the abnormal trading.

2.3. Examination window of post-announcement institutional trading

To see how institutions react to repurchase announcements, we focus on institutional trading in repurchase announcement quarter using quarterly institutional ownership data. For a closer examination, we make use of the daily institutional stock transaction data and look at how institutions trade around the announcement dates. In order to study how institutions trade when firms are buying back shares on the open market, we extend our examination to the subsequent two quarters. That is, our examination of post-repurchase institutional trading centers on the three-quarter (t, t+2) window. We do not look further beyond this window due to the following two considerations.

First, although firms can execute their announced repurchase programs over an extensive period of one to three years (Stephen and Weisbach, 1998), Lie (2005) finds that much of the actual repurchase typically occur during the quarter of (quart t), and the quarter after (quarter t+1), the announcements for most firms.[4] To take account of cases when repurchase announcements are made in the quarter end, we further our examination window to one quarter later, quarter t+2. Second, we prefer this relatively short period of time because institutional trading over a longer horizon beyond the quarter t+2 is likely noisy which confounds our examination of its informativeness about firm repurchases.

3. Institutional trading in quarters (t, t+2)

Panel A of *Table 2* presents our basic findings on institutional trading during the quarterly window (t, t+2) for both sample and matched firms. On average, institutions sell about 0.7 percent of the total shares outstanding in the announcement quarter t. The net selling continues in quarter t+1 and t+2 in a decreasing pace, with the selling in t+2 being statistically insignificant. Overall, institutions abandon about one percent of the shares

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[4] In the sample of repurchases in Gong, Louis, and Sun (2008), only 15% of firms who announce repurchases do not proceed with actual repurchases or the actual repurchases account for less than 1% of the firms' market value during these two quarters.

throughout the three-quarter window, which amounts to 2% of the pre-announcement total institutional ownership.

Using quarterly institutional ownership data does not distinguish whether the sell-off in the announcement quarter takes place before or after the announcements, although it is crucial for our examination of whether institutions trade in response to the announcements or the announcements follow institutional selling. We address this issue by using the institutional transaction-level data from Ancerno, from which we can identify institutions' daily trading around the announcement dates. To have an idea of how representative trading by institutions covered in this dataset is, we compare it with the 13f quarterly ownership dataset for all firms that are in both Ancerno and 13f. We find that, in aggregate, institutional trading in Ancerno typically accounts for about 10% of the overall institutional trading identified from 13f.[5] We therefore use mainly the 13f quarterly ownership data in most of our analysis and employ the daily trading data for robustness checks when necessary.

Results of institutional trading during the announcement quarter are presented in Panel A of *Table 10*. We find that institutions (that are covered in Ancerno) sell 0.08 percent of shares in sample firms in the quarter.[6] This is roughly consistent with our finding using the quarterly ownership data, given the partial coverage of institutional trading by Ancerno. However, most of the selling happens in a period from the announcement date till the quarter end. The magnitude of pre-announcement selling (from the beginning of the quarter to the day before the announcement date) is insignificant both statistically and economically. We also examine several intervals of shorter periods, five-day/one-month before and after the announcement date, respectively. We confirm that significant sell-off is only observed in post-announcement periods. Further, a significant part of the sell-off is concentrated within five days of the announcement.

Overall, the post-announcement institutional selling is a break from the increase in institutional holding over the four quarters prior to the announcements as documented in

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[5] Hu, Ke, and Yu (2011) have a similar finding.
[6] This magnitude of the aggregate quarterly institutional trading in Ancerno is comparable with other studies using this dataset (e.g., Jegadeesh and Tang, 2010).

Panel B of *Table 1*. It is also in contrast to the persistent increase in institutional holding concurrently in the matched firms. It suggests that the decline in institutional ownership in the sample firms is unlikely due to a downward trend in institutional holding on the market or the change in other firm characteristics. For robustness, we divide our sample into three different time periods, 1985-1992, 1993-2000, and 2001-2008. As shown in Panel B of *Table 2*, the basic trading pattern holds in all three periods. Institutional sell-off is more aggressive during 1993-2000 than in the other two periods, possibly because institutions sold more intensively in firm repurchases made before the burst of the high-tech bubble which we will discuss later.

Firms with different market capitalizations (market cap) and book-to-market ratios (bm) may have different ownership structure and institutional trading pattern. We sort repurchase firms into tercile portfolios and based on their rankings in market capitalization and book-to-market ratios. Panel C of *Table 2* summaries the results. The trading patterns are largely consistent across market cap and bm sorted terciles. For example, the abnormal selling for the tercile with the smallest market cap is 2.13% during the quarterly window (t, t+2), and that for the tercile with the largest market cap is 1.74%. Similarly, the abnormal selling for tercile with the lowest bm is 2.28% during the quarterly window (t, t+2), and 2.44% for the tercile with the highest bm, all statistically significant at the 1% level.

Institutions vary in their trading styles. We delineate institutional trading based on different institution types, and results are reported in Panel A of *Table 2* as well. We find that both type 1 and type 2 institutions sell, but type 3 institutions trade in a negligible magnitude. So hereafter, we will mainly focus on the first two types. Active institutions react swiftly to the repurchase decisions. Their sell-off accounts for the majority of institutional trading during the announcement quarter. But they do not appear to extend their selling into the subsequent two quarters. Passive institutions, in contrast, tend to smooth their selling in the three quarters. They sell in each quarter, but much less intensively. As a comparison, net trading by passive institutions is not distinguishable from zero, while active institutions buy substantially in all three quarters.

We further investigate the effect of repurchases on the firms' investor bases. An examination of the firms' actual repurchases during the same time, as reported in

Compustat item #93, finds that institutional selling accounts for 27% of all shares bought back by firms. As such, institutional ownership indeed increases following repurchases as more shares originally owned by individual investors are bought back. Firms may conduct repurchases to effect a favorable change in their investor bases. This is because, in general, high institutional ownership enables firms to communicate with investors more efficiently and thus have better access to capital markets. Also, compared to individuals, institutions are more likely to have long horizons in investment. Huang and Thakor (2012) suggest that firms with investors having different propensities in agreeing with management have incentives to buy out those who share low agreement with management. We thus further examine the change in the number of institutions in the investor base following a repurchase.

Specifically, we scale the change in the number of institutions (Δ #inst) during the measuring period by the total number of institutions holding the shares as of the end of four quarters prior to the announcement quarter (to be consistent with our measurement in the change in institutional ownership). Over the past few decades, financial institutions have been becoming a dominant force in investing. According to the Investment Company Institute 2012 fact book, the AUM by U.S.-registered investment companies increased from $3 triliion in 1995 to $13 trillion at year-end 2011. Thus, to ensure that our measure is not confounded by the increase in the number of institutions in the universe of institutions investing in equities, for each sample firm-year, we focus on its abnormal Δ #inst relative to the contemporaneous Δ #inst in the matching firm. One may argue that our measure is subject to the noise arising from transient institutions that trade frequently in specific stocks. We thus conduct a robustness check by deleting from the count of institutions in the investor base institutions that have their holdings for less than four quarters. The results, untabulated for brevity, are qualitatively similar.

Table 3 reports the results of the Δ #inst before and after the repurchase announcements. From Panel A, we find that the number of institutions in the sample firms on average increases by over 37 percent during the four quarters prior to the repurchase announcements, a magnitude significantly higher than its counterpart in the matching firms which is about 23 percent. Echoing the general trend in the universe, both sample firms and

matching firms continuously observe increases in the number of institutions in the post-announcement examination window (t, t+2). However, in contrast with the pre-announcement period, the abnormal Δ #inst turns to be negative, suggesting that sample firms experience a net outflow of institutional investors after accounting for the changes in the universe. There is an abnormal reduction in the number of institutions by 5.5 percent during the three quarters (t, t+2), compared to the abnormal addition by 14 percent in the prior four quarters. About 80% of the reduction (4.26 percent) takes place in the group of active institutions. The reduction in the number of passive institutions is neither economically nor statistically significant.

Our findings appear to be consistent with the proposal in Huang and Thakor (2012). In particular, the post-repurchase investor base shrinks; and active institutions may "vote with feet" when they disagree with management and share repurchases create buy orders, while passive institutions may not do so possibly because of their business ties to the firms. The resulted investor base is characterized by a more concentrated ownership with remaining institution investors who are more likely to agree with the management. Yet, we do not observe the agreement level of investors as econometrician, and thus we do not claim to test formally the disagreement story in Huang and Thakor (2012) here. Further, there are generally various interpretations of institutional trading in the literature. We therefore explore alternative explanations of the institutional sell-off in the next section.

4. Why do institutions sell when firms are buying?

We have shown that institutions appear not concerned with the long-run positive price drift following repurchases and sell their holding upon firms' repurchase announcements. In this section, we examine empirically why institutions sell, in addition to the disagreement story discussed above. We look at both the institutional raw trading and the abnormal trading relative to the trading in matched firms in all the three quarters in the window (t, t+2).

4.1 Share supply?

Institutions can simply sell to provide liquidity for the market to clear. We would expect that institutions sell more when there is a large demand from the repurchasing firms and the trading cost is low. We therefore rank our sample firms into terciles based on the announced repurchase program size and the liquidity of the firm's shares, respectively. And then we investigate institutional trading for firms in each ranked tercile. We measure the program size as the ratio of the announced total expense on repurchases to the firm's prior-year-end market capitalization, or the ratio of the announced total number of shares to be repurchases to the firm's prior-year-end total number of shares outstanding. We use excess share turnover as a proxy for share liquidity, which is defined as the firm's share turnover in the past four quarters in excess of the contemporaneous average share turnover for the exchange where the sample firm is listed.

We find that, in Panel A of *Table* 4, the institutional selling, either measured by raw trading or abnormal trading, increases in the program size and the excess share turnover. And this pattern holds for both active and passive institutions.[7] It suggests that institutions are supplying shares when it is less costly in doing so and when demands for shares are stronger. However, as shown in *Table* 1, the magnitude of the average institutional selling is less than one percent of the firms' shares. It is small relative to the average (median) announced repurchase size which is eight (six) percent of the firm's shares. Panel A of *Table* 4 shows that the raw institutional selling for the largest program size tercile is 1.29% for the announcement quarter, and 2.07% during the quarterly window (t, t+2), both numbers small relative to the announced repurchase size. Firms may not complete the announced programs by buying back all shares intended within the three quarters. However, the fact that the institutional selling only accounts for 27% of all shares actually bought back by firms at the same time suggests the majority of shares supplied in the market clearing are from individual investors.

The disproportionately small amount of shares supplied by institutions suggests that institutions are net buyers of shares in many firms. Indeed, the raw institutional selling in the smallest program size tercile is not significantly different from zero. Further, given the

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[7] For the sake of brevity, from Table 3 on we omit results for other institutions (type 3), because they only consist a small fraction of institutions, and their trading can be inferred from all institutional trading and the trading by type 1 and type 2 institutions.

rich information environment around firm repurchases discussed in the introduction, it is worthwhile exploring some alternative explanations of why institutions sell more in some firms than in others. Meanwhile, we will also investigate the extent of which institutional trading is informed. In these tests, we rank sample firms into terciles based on different firm characteristics related to the potential explanations of institutional trading, and examine how institutions trade in each of the ranked terciles (high/medium/low). The related firm characteristics include 6-month stock returns prior to repurchase announcements, five-day (-2, 2) announcement abnormal returns, pre-announcement institutional ownership, idiosyncratic volatility of stock returns, market capitalization, book-to-market ratio, and institutional trading in the four quarters prior to announcements. The motivation of using these variables will be explained below in each of our tests.

4.2 Momentum trading?

We test whether institutions are trading on momentum. Momentum-trading institutions would sell more in firms that have experienced worse stock returns prior to repurchase announcements. In Panel B of *Table 4*, we find some support of this hypothesis. The decline in institutional ownership is most in firms of the low tercile of prior 6-month returns. This trading pattern is more pronounced for passive institutions than active ones. In firms of the high prior returns tercile, the selling by passive institutions in our examination window is insignificant both economically and statistically.

However, we find that the magnitude of the abnormal trading is greater than that of the raw trading. Institutions do not sell or sell as much holding in the matched firms that have experienced similar performance as sample firms. It indicates that momentum trading does not explain fully institutional sell-off when firms are buying back shares. Moreover, trading by active institutions seems to be out of other motives that remain to be explored.

4.3 Profit taking?

We confirm the finding of the early literature that the abnormal stock returns around repurchase announcements are significantly positive. Specifically, the average (median) five-day abnormal returns, CAR (-2, 2), are 3% (2%). Therefore, if institutions sell their holding immediately after the repurchase announcements, they can reap a quick profit

upon the price jump. Our finding of institutional sell-off seems to be consistent with this profit-taking hypothesis. And this return-contrarian trading might slow down and prolong the price adjustment, which contributes to the long-run price drift as documented in the prior literature.

We further our analysis to see whether institutions sell more following a higher abnormal announcement returns. They may do so if their trading is mainly concerned with a quick profit taking, especially for those with short investment horizon. From the results in Panel C of *Table 4*, we fail to find such evidence. Active institutions sell more in the announcement quarter t in firms of both the high and low terciles of CAR (-2, 2) (and even more in firms of the low tercile than in firms of the high tercile) than in firms of the middle tercile. Passive institutions at the same time, instead, appear to engage in momentum trading. While selling more at low announcement returns, they do not sell at high announcement returns.

To more precisely capture institutions' reaction to the price jump, we narrow down our examination window to the days following the repurchase announcements using the daily transaction data. Specifically, we examine institutional trading in the eight-day window (3, 10) when we measure the abnormal returns of the five days (-2, 2) around announcements. Results are presented in Panel B of *Table 10*. We find that institutions sell significantly more following low abnormal returns, while they tend to maintain their holding following high abnormal returns. We find similar results if we use the five-day window (6, 10) and measure the abnormal returns in the eleven days (-5, 5). Overall, our findings suggest that institutions sell their holding beyond profit-taking *per se*.

4.4 More institutional trading in firms with greater institutional ownership?

The adverse selection theory of Brennan and Thakor (1990) suggests that uninformed investors will not tender their shares in firms' open-market repurchases if informed ownership is sufficiently high. This is because the expected loss of tendering is greater than the expected gain of tendering for uninformed investors. The intuition is as follows. Uninformed investors have to share the gain with informed investors if they tender and there is a gain in tendering, because informed investors will tender too. However, if

uninformed investors tender with a loss, they will have to take the loss alone because informed investors will not tender in this case. Assuming that institutions are more informed than individuals on average, we should observe that individuals would trade less in the repurchases when institutional ownership is higher, so that the decline in institutional ownership should be greater.

We test this prediction to show that institutions sell more when individuals are likely to keep from trading. We measure a firm's informed ownership using its institutional ownership as of one quarter prior to repurchase announcements. As shown in Panel D of *Table 4*, we find that institutional ownership drops significantly more in firms with higher prior institutional ownership. For instance, the abnormal change in institutional ownership in the repurchase announcement quarter t is -2.7 percent of total shares outstanding for firms in the high tercile of institutional ownership as of quarter t-1, and it is highly significant. In comparison, despite being statistically indistinguishable from zero, the abnormal change is 0.18 percent for firms in the low tercile.[8] The results are robust to the institutional trading window.

In sum, we find evidence in support of Brennan and Thakor (1990). Institutions sell more and individual investors tend to refrain from tendering their shares in open-market repurchases when institutional ownership is higher.

4.5 The impact of arbitrage cost

As discussed in the introduction, repurchases can create a wealth transfer between tendering and withholding shareholders. Institutions can arbitrage by buying undervalued stocks. The small magnitude of institutional sell-off that we have shown earlier suggests that there are many institutions buying shares during firms' repurchases. Given that open-market repurchases are a noisy signal of firm valuation, arbitrage is costly in general. It is even more so when repurchasing firms have more informational uncertainty. On the other hand, given the fixed information collection cost, informed investors can obtain greater gain in firms with more information asymmetry (Brennan and Thakor, 1990). Therefore,

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[8] The results for institutional ownership as of four quarters prior to the announcement are qualitatively consistent with the results reported on Panel D of *Table* 3. They are available upon request.

institutions face a trade-off between the cost and gain of arbitrage. In equilibrium, when we observe institutions buying stocks of repurchase firms, it suggests that the gain of arbitrage outweighs the cost for these institutions. Overall, the following hypothesis holds that institutions are less likely to buy shares of repurchasing firms when the informational uncertainty of these firms is higher, but when they buy, they would gain from such stock purchases.

Here we test the first part of this hypothesis by relating institutional trading to firms' informational uncertainty. We leave the test of the second part to the analysis when we examine the return predictability of institutional trading later. We use idiosyncratic volatility (IV) of repurchasing firms' stock returns as a proxy for their information uncertainty. The results presented in Panel E of *Table 4* confirm this conjecture. Institutions, especially those active in trading, tend to sell more shares in firms of the high IV tercile. Specifically, the abnormal selling by active institutions in high-IV firms more than doubles that in low-IV firms in the repurchase announcement quarter. And this difference appears to persist in the two subsequent quarters. Our finding indicates that institutions are less likely to buy, or rather sell shares upon firms' repurchase decisions possibly because of the high arbitrage cost arising from the informational uncertainty in those firms.

4.6 Ill-timed/motivated repurchases

Firms may not always decide to repurchase shares because managers believe their shares are undervalued. Prior studies have suggested that firms may repurchase to mimic their competitors' repurchase decisions (Massa, Rehman, and Vermaelen, 2007), or to boost up the firms' earnings-per-share towards analysts' forecast (Hribar, Jenkins, and Johnson, 2006), especially when managers' own compensation is linked to a target of earnings-per-share (Cheng, Harford, and Zhang, 2010). Anecdotally, practitioners were concerned with repurchases that are insensitive to firms' intrinsic valuations. For instance, an article by Liam Denning (*Wall Street Journal*, October 6, 2008), also quoted in DeAngelo, DeAngelo, and Skinner (2008), states that "Warren Buffet knows a value stock when he sees it. Other executives can struggle with the concept – particularly when it comes to their own company's shares."

Overall, as discussed in DeAngelo, DeAngelo, and Skinner (2008), many firms seem to have surrendered their market-timing ability in their repurchase decisions. This is especially so for those repurchases made during the market boom before the high-tech bubble burst in 2001 and the financial meltdown in 2008.[9] Firms that made repurchase when they were highly valued, and only observed their stock prices dropped well below the repurchasing prices subsequently. It is also likely that these firms exhausted their cash holding and failed to build a cash cushion against slowdown in growth during economic and financial downturns. Such ill-timed/motivated repurchases clearly benefited the selling investors at the expense of loyal (withholding) investors. We thus examine how institutions trade upon repurchase announcements during two specific periods – 1998-1999 and 2006-2007.

The findings presented in Panel B of *Table* 2 show that institutions sold dramatically more in 1998-1999 than the sample average while their reactions were more tepid in 2006-2007. It seems that the subsequent systematic financial market meltdown was unexpected even among institutional investors in 2006-2007. Instead, in 1998-1999, institutions either disagreed more with the repurchase decisions or might have simply taken advantage of the repurchases to exit these firms. During the three quarters (t, t+2), the sell-off of 0.97 percent by passive institutions doubled the sample average, while active institutions sold 2.4 percent of the firms' shares, a magnitude of five times of the sample average. In comparison, the contemporaneous change in institutional ownership in the matched firms was insignificantly different from zero. Our finding echoes the findings by Brunnermeier and Nagel (2004) and Griffin, Harris, Shu, and Topaloglu (forthcoming) that informed investors rode on the high-tech bubble and exited before its burst. Share repurchases by firms provided an opportunity for such a profitable exit.

Besides the special time periods, we further analyze how institutions may react to ill-timed/motivated repurchases more generally. Yet, it is difficult to measure, *ex ante*, how well a repurchase decision is timed. We circumvent this empirical challenge by studying whether institutions endorse managerial decisions prior to the repurchase announcements

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[9] Jiang and Koller (2011) find that S&P 500 companies fail to consistently pick the right time to buy back their shares at advantageous prices for the years 2004 through 2010.

through their trading activities. The more increase in institutional holding, the more likely are institutions to agree with management, which implies a higher firm valuation.[10] One might argue that institutions may increase their holding when firms are undervalued. But the undervaluation should diminish with the increase in institutional ownership. Therefore, a firm's decision to buy back shares would not be as a good timing when institutional investors have been buying heavily into the firm's stock as when they have been fleeing away from it. Specifically, we examine how institutions react to repurchases differently in firms with different prior institutional trading in the past four quarters.

The results are in Panel A of *Table 5*. In the announcement quarter t, the abnormal institutional sell-off is concentrated in firms of high and medium terciles of prior change in institutional ownership, with the magnitude of the sell-off being significantly greater in firms of the high tercile. We do not observe an abnormal institutional trading in firms of the low tercile. The negative relationship between pre-announcement and post-announcement institutional trading holds for the longer examination window (t, t+2) and for both active and passive institutions. It confirms that, when firms make repurchases that are less desired by institutions and thus are more poorly timed, institutions tend to "vote with their feet". We also test this hypothesis in the two special time periods. The results are robust in both cases, although more pronounced for the period 1998-1999. In firms of the high tercile of prior institutional trading, the abnormal drop in institutional ownership amounts to 6.3 percent of shares outstanding, most of which is accounted for by active institutions.

One possible alternative explanation is that institutions might have been accumulating shares in anticipation of the repurchase announcements so that they can profit from selling upon the price jump on announcements. However, this arbitrage strategy on a voluntary firm decision such as repurchase is risky ex ante. It is unclear whether institutions will take this risk at the first hand. Moreover, our finding on institutional trading upon high vs. low abnormal returns around repurchase announcements, as shown in both Panel B of *Table 4* and Panel B of *Table 10*, has suggested that institutions are unlikely to trade to take a quick profit. They sell more when the abnormal returns are lower, and do not sell at all upon high

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[10] Alternatively, one may be concerned that institutions increase their holding for the sole purpose of speculation in some circumstances. But speculation would also boost up stock prices which diminishes the likelihood of undervaluation.

returns. This finding is rather consistent with institutions being more likely to abandon firms, whose repurchase decisions are not so well received by investors, as can be seen by the low announcement returns.

Lastly, we investigate how remaining shareholders may be fared after poorly timed/motivated repurchases. We look at the differences of the cumulative stock returns following repurchase announcements between firms of the high tercile and firms of the low tercile of pre-announcement change in institutional ownership. As Panel C of *Table 5* shows, in the subsequent year (quarters t+1 to t+4), firms of the high tercile underperform by 5.27% in stock returns compared to those of the low tercile. This underperformance continues in the second year, although it becomes statistically insignificant.

4.7 Multivariate regression

We have shown that institutions sell significantly more in firms with higher idiosyncratic volatility (IV), and suggested that institutions refrain from buying into high-IV firms because of the more daunting arbitrage cost in these firms. It is likely that firms with better growth opportunities have higher IV. Therefore, the IV-trading relationship might arise from investors' concern that the cash distributed through repurchases could have been better utilized in investing in more positive NPV projects. As such, we need to control for growth opportunities in examining the IV-trading relation. Similarly, pre-announcement institutional trading may be related to certain firm characteristics that would also affect the post-announcement institutional trading, such as prior stock returns and growth opportunities. To show the robustness of the findings from the above univariate analysis, we conduct a multivariate regression of the post-announcement institutional trading.

We present the regression results in *Table 6* for both the overall institutional trading and trading by active institutions. And we focus on their trading in the announcement quarter t and the three-quarter window (t, t+2). Overall, institutions tend to sell more in the announcement quarter in firms with greater increase in pre-announcement institutional ownership, higher idiosyncratic volatility, and larger announced program size. Meanwhile, they buy more if the firms experience better stock returns prior to the announcements or if

the announcement returns are higher. Consistent with the univariate analysis, we do not find that institutional trading is related to firm size or the book-to-market ratio. The results for trading in the three-quarter window are similar, except that the relation of institutional trading with IV and the announcement returns becomes insignificant. It suggests that these two factors only affect institutions' short-term trading behavior. Given that trading by active institutions accounts for the most of the institutional trading, results for active institutions do not change qualitatively.

4.8 Informativeness of institutional trading

In this section, we investigate whether and to what extent institutional trading is informative by examining the relation between institutional trading and the future stock returns. While the overall post-repurchase institutional ownership declines, the magnitude is relatively small and many firms experience a net inflow of institutional investment. We therefore compare the returns of stocks that institutions buy with those they sell. The literature has suggested that stock purchases are typically more informative about future returns than stock sales. In this regard, we focus on institutional net purchases.

Specifically, we rank all sample firms into quintiles based on their abnormal institutional trading (overall, passive, and active, respectively) during the announcement quarter t. We examine separately the returns for the quintile with the most increase in institutional ownership (top increase in IO), and those with the most decrease in institutional ownership (top decrease in IO), up to eight quarters following the ranking quarter. For both quintiles, we report the average returns in excess of the market returns for the sample firms, as well as those for the matched firms, and the difference between the two. We also report the average difference in returns between these two quintile portfolios.

The baseline results are shown in *Table 7*. Firms of the top quintile of change in IO significantly outperform their matched counterparties over the following year (quarter t+1 to t+4), while firms of the bottom quintile of change in IO do not outperform persistently during the same time or even underperform. Yet, the return predictability is limited to trading by active institutions. Taken together with passive institutions' smooth trading which is in a closer pace with of firm actual buybacks on the open market over time, we

conclude that trading by passive institutions mostly serves the purpose of liquidity provision.

The outperformance by firms of the top quintile of change in active IO is observed in every quarter of the year and is significant for the first two quarters. The total one-year abnormal stock return amounts to 4.6%. In contrast, firms of the bottom quintile of change in active IO have experienced significantly negative abnormal stock returns in the first two quarters of the subsequent year, and no significantly positive abnormal returns are observed in these firms for next two quarters. Our findings suggest that institutions, typically active ones, are informed in their trading. And they appear to be better informed when they buy than when they sell. Their return predictability, however, decays over a longer time period. We do not find evidence that stocks purchased by active institutions continue to outperform in the second year of the repurchases.

We further examine the return predictability of institutional trading on stock repurchase using the Ancerno transaction-level data. Panel C of *Table* 10 shows the stock returns over a one-year period following 5-day institutional trading upon repurchase announcement. During the 3 months following the 5-day trading upon announcement, those stocks with the most increase in institutional ownership earn an average return of 3.84% in excess of the market return, which is 1.78% more than earned by those with the most decrease in institutional ownership. The difference is statistically significant at the 10% level. The return difference becomes smaller for longer horizons, although there is no evidence of return reversal over the one-year period. Overall, the results from the transaction level data are qualitatively consistent with those from the quarterly trading data.

The costs of collecting and processing information are higher in informationally more opaque firms. But that is where institutional investors' advantage in this respect is more pronounced. We split the sample into halves based on firms' market capitalizations, book-to-market ratios, and prior stock returns. Firms with more information asymmetry are more likely to be undervalued, and thus we include prior stock returns as a potential proxy for undervaluation. We expect that institutional trading has better return predictability in small, growth and poorly-performing firms. Our analysis presented in Table 8 shows just the case. Indeed, we do not find evidence of reliable return predictability in large, value and better

performed firms. The findings suggest that while institutions sell more in firms with poorer prior performance, their purchases can better predict future returns when they buy.

Theories as in Grossman and Miller (1988) and Campbell, Grossman, and Wang (1993) suggest that investors need to be compensated in providing shares to meet immediate demands from the other side of the trade. Firms' share repurchases create large liquidity needs. Compared to that from individuals, supply of shares from institutions is more efficient in meeting such needs due to their large holdings. Therefore, it is likely that the return pattern of institutional trading documented above reflect the liquidity provision to repurchasing firms who require immediacy instead of informational skills.

To disentangle the information interpretation from the alternative liquidity provision story of return patterns, we adopt a similar approach as in Kaniel, Liu, Saar, and Titman (2012) and decompose the abnormal returns into an information component and a liquidity provision component. Specifically, each quarter we run the following cross-sectional regressions across all firms that do not make repurchase announcements from eight quarters before until eight quarters after the current quarter:

$$R_{Q1}(R_{Q2}) = \text{intercept} + \Delta IO + \text{market cap} + \text{bm} + \text{past return}$$

where $R_{Q1}(R_{Q2})$ is the quarterly stock return in excess of the market return for the first (second) quarter following the announcement quarter. ΔIO is the total institutional trading during the announcement quarter. Market cap, bm, and past return are the market capitalization, book-to-market ratio, and past 12-month return available at announcement quarter. To obtain the expected returns for sample firms (R_{exp}), each quarter we multiply the realizations of ΔIO, market cap, bm, and past return for sample firms by the estimated coefficients from the above regression. The residual return (R_{res}) is calculated as the difference between the market excess return and the expected return. Intuitively, the expected and residual returns capture the liquidity provision and the information components, respectively.

As what we have done earlier, in every quarter, we rank all repurchasing firms into quintiles based on their institutional trading during the announcement quarter. We examine both R_{exp} and R_{res} for the quintile with the most increase in institutional ownership

(top increase in IO), and those with the most decrease in institutional ownership (top decrease in IO), up to 2 quarters following the ranking quarter. The results on this decomposition are reported in *Table 9*. We find no evidence of the liquidity provision premium. The difference of the expected returns between the top increase and top decrease in IO quintiles is not statistically different from zero. The abnormal returns documented in *Table 7* are attributed solely to trading on information. The difference of the residual returns between the top increase and top decrease in IO quintiles is of similar magnitude with the overall difference of the abnormal returns shown in *Table 7*. And this finding is consistent across different types of institutions.

5. Conclusion

In this paper, we document for the first time in the literature how institutional investors trade when firms are buying back shares. Using both the quarterly institutional ownership data and institutional transaction-level data, we find that institutions on average sell following repurchase announcements. Institutions provide shares in satisfying share demand from repurchasing firms for the market to clear. But the magnitude of overall institutional sell-off is small, accounting for 27% of shares actually bought back by firms at the same time. Therefore, institutional ownership increases following firm repurchases. Firms may tend to optimize their investor bases through repurchases as some institutions are bought out. After accounting for the changes in the universe of institutions, we find that the number of institutions remaining in the investor base declines after firm repurchases. Thus, firms realize a more concentrated institutional ownership, which may be preferable for management.

We also examine several alternative explanations for the institutional sell-off. Institutions appear to trade on momentum as they sell more in firms with poorer recent stock returns. But institutions persistently buy into the matched control firms that are similarly performed. Also, we do not find evidence indicating that institutions trade only to take a quick profit from stock price rise upon repurchase announcement. Instead, we find that higher arbitrage costs appear to be important in explaining why institutions are less likely to buy into some stocks. Institutions sell more in firms with higher institutional ownership, as individual investors shy away from trading in these firms. Furthermore, we

find that institutions tend to abandon stocks of firms that have conducted ill-timed/motivated repurchases. While institutions on average sell holding in repurchasing firms, there are many firms that experience a net purchase by institutions. There is evidence that institutional trading is informed. We find that the future returns of institutional trading are attributed to information rather than liquidity provision. Institutional purchase is more informative of future stock returns than institutional sell-off. But this return predictability only lives up to one year subsequent to repurchase announcements.

Our study has important implications for firms' cash payout policy. Unlike dividends, share repurchases are often argued as involving a wealth transfer between tendering shareholders and withholding shareholders. Our findings suggest that institutions often trade not so distinctly from individual investors, and thus are not necessarily always in an advantage to exploit individual investors. But in firms with more information asymmetry, institutional investors' informational advantage is more pronounced, and thus their trading has welfare implication. Moreover, when firms repurchase to alter their ownership structure, our study suggests that they need to consider the reaction of institutional investors.

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Table 1 Summary statistics and pre-buy-back institutional trading

This table reports summary characteristics of buy-back firms and institutional trading on these firms prior to the buy-back announcement. We include only open market repurchases with program size greater than 1%. If there're multiple buy-backs announcements during a year, we only include the first one. We report institutional trading from four quarters before till the end of the quarter prior to the announcement. For each firm with repurchase announcement, we also find a matched firm. The matched firm is traded in the same calendar quarter and has no repurchase announcement within two years before and after the announcement quarter. The matched firm has the closest propensity score to the event firm during the event quarter, where the propensity score is determined based on the logit regression where the factors are past four quarters institutional holdings, market capitalization and book-to-market ratio as of the previous quarter, and prior 12 month returns. In Panel A, we report the sample mean, median, and standard deviation of the market capitalization, book-to-market ratio, prior 12 month returns, and institutional percentage holdings for the four quarters prior to the announcement quarter (Q_{-4} to Q_{-1}), for both the sample and the matched firms. We also report the mean of the difference in these characteristics between the sample and the matched firms, and the corresponding t values. In panel B, we report the trading patterns for the sample firms, as well as the abnormal trading as the difference in trading between the sample and the matched firm. In addition, we report the abnormal trading of the sample firm relative to the average institutional trading for the same quarter (benchmark2). We report the trading patterns for all institutions (type0), passive institutions (type1), active institutions (type2) and others (type3). The sample period is from January 1985 to Dec 2008. The reported trading figures are in percentage.

Panel A: Summary statistics	sample firms			matched firms			sample - matched	
	mean	median	stdev	mean	median	stdev	mean	t value
log of market cap ($million)	5.97	5.82	2.02	5.58	5.59	1.91	0.39	21.27
book to market ratio	0.66	0.54	0.67	0.67	0.53	0.77	0.00	-0.20
past 1 year return	0.14	0.04	0.54	0.15	0.07	0.63	-0.01	-0.68
institutional holding (Q_{-1})	0.48	0.48	0.28	0.48	0.48	0.31	0.00	-0.84
institutional holding (Q_{-2})	0.48	0.47	0.28	0.48	0.47	0.31	0.00	-0.86
institutional holding (Q_{-3})	0.47	0.46	0.28	0.47	0.47	0.30	-0.01	-3.73
institutional holding (Q_{-4})	0.46	0.45	0.28	0.46	0.45	0.30	0.00	-1.75
car (-2, +2)	0.03	0.02	0.10					
program size	0.08	0.06	0.08					
N	10119			10119				

Panel B	sample firm trading				abnormal trading (relative to matched firm)				abnormal trading (relative to benchmark2)			
	type0	type1	type2	type3	type0	type1	type2	type3	type0	type1	type2	type3
Trading (Q_{-4} - Q_{-1})	2.40	0.44	1.80	0.16	0.13	0.17	0.00	-0.04	1.51	0.44	0.99	0.08
t-value	20.70	8.90	18.91	6.12	0.80	2.40	0.03	-1.10	13.33	9.05	10.70	2.96
Trading (Q_{-1})	0.59	0.10	0.44	0.05	0.01	0.04	-0.03	0.00	0.27	0.11	0.14	0.02
t-value	6.98	2.46	6.33	2.30	0.07	0.64	-0.29	-0.01	3.38	2.85	2.06	1.11

Table 2 Institutional trading upon stock buy-back announcement

This table reports institutional trading pattern on stocks upon repurchase announcement. The repurchase sample selection and the construction of matching firms are discussed in Table 1. We report the average trading for the sample firm, the matched firm, as well as the abnormal trading as the difference in trading between the sample and the matched firm. We report the trading patterns for all institutions (type0), passive institutions (type1), active institutions (type2) and others (type3). Panel A reports results for the whole sample period from January 1985 to Dec 2008. Panel B reports five sub-period results: 1985-1992, 1993-2000, 2001-2008, 1998-1999, and 2006-2007. Panel C reports the results on tercile sub-sample based on market capitalization (market cap) and boo-to-market (bm) rankings. The reported trading figures are in percentage.

	sample firm trading				matched firm trading				abnormal trading			
	all	type 1	type 2	type 3	all	type 1	type 2	type 3	all	type 1	type 2	type 3
Panel A: whole sample												
Trading (Q_0)	-0.69	-0.18	-0.53	0.02	0.60	0.05	0.45	0.10	-1.29	-0.23	-0.98	-0.08
t-value	-7.97	-4.58	-7.32	0.79	6.20	1.17	5.53	3.59	-10.54	-4.08	-9.53	-2.41
Trading (Q_1)	-0.21	-0.19	0.00	-0.03	0.59	0.02	0.51	0.06	-0.80	-0.21	-0.51	-0.08
t-value	-2.65	-5.30	0.03	-1.43	5.91	0.55	6.20	2.16	-6.64	-3.81	-5.07	-2.70
Trading (Q_2)	-0.05	-0.11	0.04	0.01	0.11	-0.04	0.16	-0.01	-0.16	-0.07	-0.12	0.03
t-value	-0.67	-3.24	0.66	0.67	1.05	-0.88	1.89	-0.48	-1.30	-1.24	-1.13	0.83
Trading ($Q_0 - Q_2$)	-0.95	-0.47	-0.48	0.00	1.30	0.03	1.12	0.14	-2.25	-0.51	-1.61	-0.14
t-value	-8.62	-10.35	-5.22	0.11	8.92	0.58	9.24	4.05	-12.86	-7.06	-10.91	-3.22
Panel B: Subsample: sub-periods												
1985 – 1992												
Trading ($Q_0 - Q_2$)	-0.52	-0.31	-0.41	0.19	1.70	0.05	1.44	0.20	-2.22	-0.36	-1.85	-0.01
t-value	-2.30	-2.72	-2.25	3.20	6.24	0.36	7.43	2.26	-6.38	-1.95	-7.14	-0.09
1993 – 2000												
Trading ($Q_0 - Q_2$)	-1.29	-0.54	-0.74	-0.01	1.51	0.15	1.15	0.20	-2.80	-0.69	-1.89	-0.21
t-value	-8.02	-7.90	-5.46	-0.20	6.91	1.80	6.26	4.02	-10.86	-6.43	-8.68	-3.56
2001 – 2008												
Trading ($Q_0 - Q_2$)	-0.67	-0.46	-0.12	-0.09	0.75	-0.17	0.90	0.02	-1.42	-0.29	-1.03	-0.10
t-value	-3.35	-6.52	-0.73	-1.46	2.92	-2.00	4.09	0.30	-4.53	-2.79	-3.79	-1.27
1998 – 1999												
Trading ($Q_0 - Q_2$)	-3.37	-0.97	-2.43	0.04	0.02	-0.12	-0.24	0.37	-3.39	-0.86	-2.20	-0.33
t-value	-10.96	-8.40	-9.62	0.63	0.04	-0.79	-0.71	3.46	-7.18	-4.62	-5.48	-2.75
2006 – 2007												
Trading ($Q_0 - Q_2$)	-1.11	-0.74	-0.11	-0.26	0.64	-0.34	1.17	-0.19	-1.76	-0.41	-1.28	-0.07
t-value	-2.89	-5.29	-0.34	-2.34	1.47	-2.14	3.04	-1.46	-3.14	-2.00	-2.59	-0.40

Panel C: market capitalization (market cap) and book-to-market (bm) subsamples

		sample firm trading				matched firm trading				abnormal trading			
		all	type 1	type 2	type 3	all	type 1	type 2	type 3	all	type 1	type 2	type 3
market cap	Trading ($Q_0 - Q_2$)	-0.52	-0.2	-0.35	0.02	1.61	0.33	1.14	0.14	-2.13	-0.53	-1.48	-0.12
Low	t-value	-3.12	-2.85	-2.41	0.62	7.07	4.01	5.87	2.59	-7.77	-4.94	-6.34	-1.82
Market cap	Trading ($Q_0 - Q_2$)	-1.12	-0.57	-0.55	0	1.76	-0.03	1.61	0.18	-2.88	-0.54	-2.16	-0.18
Medium	t-value	-5.24	-6.94	-2.98	0.08	7.05	-0.33	7.66	2.73	-9.18	-4.4	-8.05	-2.07
market cap	Trading ($Q_0 - Q_2$)	-1.22	-0.65	-0.55	-0.02	0.52	-0.2	0.62	0.11	-1.74	-0.45	-1.17	-0.12
high	t-value	-6.38	-7.66	-3.69	-0.39	1.9	-1.76	2.74	1.71	-5.45	-3.18	-4.5	-1.68
bm	Trading ($Q_0 - Q_2$)	-1.29	-0.63	-0.74	0.09	0.99	-0.16	1.04	0.11	-2.28	-0.48	-1.78	-0.03
Low	t-value	-5.88	-7.57	-4.05	1.94	3.75	-1.62	4.62	1.91	-6.83	-3.78	-6.32	-0.38
bm	Trading ($Q_0 - Q_2$)	-0.41	-0.32	-0.10	0.01	1.63	0.10	1.42	0.12	-2.04	-0.42	-1.51	-0.11
Medium	t-value	-2.30	-4.24	-0.65	0.23	6.39	0.93	6.71	2.08	-6.92	-3.28	-6.15	-1.50
bm	Trading ($Q_0 - Q_2$)	-1.17	-0.46	-0.61	-0.09	1.27	0.16	0.91	0.20	-2.44	-0.62	-1.53	-0.29
high	t-value	-6.63	-5.96	-4.18	-1.72	5.41	1.70	4.70	2.93	-8.73	-5.22	-6.51	-3.41

Table 3 Change in the number of institutions holding company shares around stock buy-back announcement

This table reports change in the number of institutions holding company shares (Δ #inst) before and after the repurchase announcement. The repurchase sample selection and the construction of matching firms are discussed in Table 1. Δ #inst is defined as the change in the number of institutions holding company shares during the measuring period, scaled by the total number of institutions holding the shares as of the end of four quarters prior to the announcement quarter. We report the average Δ #inst for the sample firm, the matched firm, as well as the abnormal change as the difference in Δ #inst between the sample and the matched firm. We report the Δ #inst patterns for all institutions (type0), passive institutions (type1), active institutions (type2) and others (type3). Panel A reports results for Pre-announcement quarters. Panel B reports those for post-announcement quarters. The sample period is from January 1985 to December 2008. The reported Δ #inst numbers are in percentage.

	sample firm trading				matched firm trading				abnormal trading			
	all	type 1	type 2	type 3	all	type 1	type 2	type 3	all	type 1	type 2	type 3
Panel A: Pre- buy-back announcement Δ #inst												
Δ #inst (Q-4 - Q-1)	37.89	13.16	20.94	3.79	23.64	7.01	14.53	2.09	14.25	6.16	6.40	1.70
t-value	6.12	4.75	7.12	6.20	7.28	6.40	7.51	7.59	2.04	2.07	1.82	2.54
Δ #inst (Q_{-1})	9.69	3.34	5.22	1.13	8.62	2.61	5.27	0.75	1.07	0.73	-0.05	0.39
t-value	3.59	2.80	3.90	3.91	3.13	2.70	3.31	3.19	0.28	0.48	-0.03	1.04
Panel A: Post- buy-back announcement Δ #inst												
Δ #inst (Q_0)	1.08	0.50	-0.02	0.61	2.54	0.60	1.50	0.44	-1.46	-0.10	-1.53	0.17
t-value	1.18	1.35	-0.04	4.99	1.17	0.89	1.12	2.13	-0.62	-0.13	-1.05	0.70
Δ #inst (Q_1)	2.35	0.59	1.58	0.18	5.36	1.15	3.73	0.47	-3.01	-0.56	-2.16	-0.29
t-value	3.43	2.08	3.63	1.73	5.16	4.51	4.90	4.62	-2.43	-1.47	-2.46	-2.03
Δ #inst (Q_2)	2.78	0.50	1.81	0.47	3.84	0.94	2.39	0.52	-1.06	-0.43	-0.58	-0.05
t-value	3.82	1.67	4.00	4.13	6.03	3.73	6.34	5.08	-1.10	-1.10	-0.99	-0.33
Δ #inst ($Q_0 - Q_2$)	6.21	1.59	3.36	1.25	11.75	2.69	7.63	1.43	-5.53	-1.09	-4.26	-0.18
t-value	4.96	3.67	4.10	7.50	4.45	3.38	4.51	6.38	-1.90	-1.21	-2.27	-0.64

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Table 4: Institutional trading upon stock buy-back announcement: various hypotheses

This table reports institutional trading upon repurchase announcement for stocks with various firm characteristics, based on a number of hypotheses that might explain the trading patterns. The repurchase sample selection and the construction of matching firms are discussed in Table 1. Each sample firm is assigned into one of the three terciles (low/medium/high) based on its ranking during the announcement year of the average value of a certain firm characteristic for the past four quarters. For each firm characteristic ranked tercile, we then calculate the abnormal institutional trading as the difference in trading between the sample and the matched firm, from the announcement quarter until two quarters following the announcement. We then report the average abnormal trading across terciles and time. We consider the following firm characteristics: buy-back program size as percentage of the firm's market capitalization (program size), stock turnover in excess of the average stock turnover for the exchange where the sample stock is traded (xto), prior-6 month returns, the cumulative abnormal returns from two days before until two days after the announcement (CAR (-2, +2)), institutional ownership at the end of the quarter prior to the announcement quarter (Q_{-1}), and idiosyncratic volatility (iv). All results are reported in five panels, each representing a different hypothesis, as indicated by the panel titles. We report trading by all institutions (all) and by type1 and type2 institutions. We report both the average raw trading (Raw Trading) and the abnormal trading (Abn. Trading) as defined in Table 2. The sample period is from January 1985 to December 2008. The trading figures are in percentage.

firm characteristic ranking		Low			Medium			High		
		all	type1	type2	all	type1	type2	all	type1	type2
Panel A : Share supply?										
program	Raw Trading(Q_0)	-0.12	-0.06	-0.12	-0.65	-0.20	-0.51	-1.29	-0.27	-0.95
size	t-value	-0.92	-1.07	-1.08	-4.31	-2.95	-4.11	-7.95	-3.64	-6.93
	Raw Trading (Q_0-Q_2)	0.08	-0.19	0.20	-0.86	-0.50	-0.37	-2.07	-0.73	-1.28
	t-value	0.43	-2.50	1.40	-4.52	-6.41	-2.29	-9.99	-8.82	-7.28
	Abn. Trading(Q_0)	-0.79	-0.01	-0.7	-1.26	-0.31	-0.94	-1.82	-0.35	-1.3
	t-value	-3.89	-0.11	-4.16	-6.03	-3.31	-5.48	-8.16	-3.6	-6.73
	Abn. Trading (Q_0-Q_2)	-1.36	-0.21	-1.06	-2.28	-0.6	-1.54	-3.12	-0.7	-2.22
	t-value	-4.59	-1.72	-4.28	-7.7	-4.6	-6.34	-9.84	-6	-8.13
xto	Raw Trading(Q_0)	-0.24	-0.13	-0.13	-0.57	-0.20	-0.31	-1.28	-0.21	-1.17
	t-value	-1.92	-1.75	-1.34	-3.92	-3.27	-2.57	-7.37	-3.07	-7.74
	Raw Trading (Q_0-Q_2)	-0.26	-0.17	-0.15	-0.80	-0.52	-0.16	-1.82	-0.73	-1.17
	t-value	-1.84	-2.16	-1.30	-4.48	-7.08	-1.07	-7.65	-8.52	-5.74
	Abn. Trading(Q_0)	-0.75	-0.1	-0.61	-1.33	-0.28	-0.9	-1.81	-0.3	-1.45
	t-value	-4.01	-0.99	-4.06	-6.19	-3.01	-4.98	-7.87	-3.24	-7.27
	Abn. Trading (Q_0-Q_2)	-1.66	-0.3	-1.25	-2.41	-0.54	-1.58	-2.72	-0.68	-2.01
	t-value	-6.5	-2.5	-5.99	-7.84	-4.42	-6.13	-7.97	-5.24	-6.91
Panel B: Momentum trading?										
prior	Raw Trading(Q_0)	-1.15	-0.39	-0.76	-0.23	-0.07	-0.22	-0.68	-0.08	-0.61
6-month	t-value	-7.60	-6.23	-5.87	-1.58	-0.92	-1.84	-4.54	-1.15	-4.86
return	Raw Trading (Q_0-Q_2)	-1.46	-0.80	-0.60	-0.67	-0.42	-0.25	-0.73	-0.20	-0.60
	t-value	-7.67	-10.75	-3.63	-3.83	-5.33	-1.75	-3.52	-2.41	-3.50
	Abn. Trading(Q_0)	-1.83	-0.37	-1.34	-0.83	-0.16	-0.61	-1.2	-0.14	-0.99
	t-value	-8.53	-3.92	-7.39	-4.05	-1.6	-3.55	-5.61	-1.59	-5.49
	Abn. Trading (Q_0-Q_2)	-3.02	-0.82	-2.01	-1.96	-0.51	-1.28	-1.77	-0.18	-1.53
	t-value	-10.04	-6.92	-7.82	-6.54	-3.88	-5.16	-5.74	-1.51	-5.89

firm characteristic ranking		Low			Medium			High		
		all	type1	type2	all	type1	type2	all	type1	type2
Panel C: profit taking?										
CAR	Raw Trading(Q_0)	-1.04	-0.26	-0.80	-0.34	-0.09	-0.24	-0.71	-0.19	-0.55
(-2, +2)	t-value	-6.65	-3.60	-6.20	-2.56	-1.52	-2.19	-4.54	-2.88	-4.16
	Raw Trading (Q_0-Q_2)	-1.31	-0.60	-0.72	-0.60	-0.33	-0.25	-0.98	-0.50	-0.49
	t-value	-6.40	-7.53	-4.22	-3.63	-4.45	-1.78	-4.87	-6.08	-2.94
	Abn. Trading(Q_0)	-1.71	-0.37	-1.19	-1.05	-0.19	-0.82	-1.13	-0.13	-0.94
	t-value	-7.97	-3.89	-6.54	-5.19	-1.94	-4.88	-5.2	-1.4	-5.11
	Abn. Trading (Q_0-Q_2)	-2.5	-0.64	-1.68	-1.91	-0.35	-1.35	-2.38	-0.54	-1.8
	t-value	-7.93	-5.45	-6.26	-6.59	-2.67	-5.65	-7.81	-4.39	-7.03
Panel D: institutional ownership?										
Past	Raw Trading(Q_0)	0.73	0.21	0.48	-0.26	-0.09	-0.19	-2.54	-0.65	-1.87
holding	t-value	6.19	4.55	4.92	-1.92	-1.64	-1.65	-13.84	-7.10	-12.19
(Q_{-1})	Raw Trading (Q_0-Q_2)	1.30	0.24	0.95	-0.45	-0.38	-0.11	-3.71	-1.27	-2.28
	t-value	8.58	4.51	7.77	-2.44	-5.45	-0.73	-16.61	-12.24	-12.03
	Abn. Trading(Q_0)	0.18	0.12	0.07	-1.33	-0.26	-0.98	-2.71	-0.53	-2.03
	t-value	1	1.65	0.46	-6.59	-2.62	-5.77	-10.99	-4.73	-9.76
	Abn. Trading (Q_0-Q_2)	-0.57	0	-0.53	-2.12	-0.57	-1.53	-4.07	-0.96	-2.76
	t-value	-2.19	0.05	-2.46	-7.1	-4.66	-6.01	-11.87	-6.35	-9.58
Panel E: Arbitrage cost?										
iv	Raw Trading(Q_0)	-0.45	-0.20	-0.26	-0.74	-0.20	-0.55	-0.98	-0.15	-0.84
	t-value	-3.16	-2.65	-2.46	-5.00	-3.13	-4.38	-6.04	-2.31	-5.89
	Raw Trading (Q_0-Q_2)	-0.83	-0.44	-0.30	-1.22	-0.50	-0.72	-1.01	-0.51	-0.54
	t-value	-5.01	-5.17	-2.42	-6.38	-6.50	-4.46	-4.66	-6.60	-2.84
	Abn. Trading(Q_0)	-0.81	-0.16	-0.6	-1.46	-0.31	-0.99	-1.65	-0.22	-1.39
	t-value	-3.87	-1.47	-3.58	-6.9	-3.18	-5.54	-7.49	-2.61	-7.3
	Abn. Trading (Q_0-Q_2)	-1.86	-0.39	-1.19	-2.24	-0.5	-1.65	-2.74	-0.65	-2.06
	t-value	-6.47	-2.81	-5.14	-7.24	-4.03	-6.36	-8.59	-5.84	-7.41

Table 5 Institutional trading upon stock buy-back announcement: conditional on pre-announcement trading

This table reports institutional trading upon repurchase announcement, conditional on pre-announcement trading. The repurchase sample selection and the construction of matching firms are discussed in Table 1. Each sample firm is assigned into one of the three terciles (low/medium/high) based on its cross-sectional ranking during the announcement year of the trading (Q_{-4} - Q_{-1}). Panel A reports the average trading across terciles and time. We report trading by all institutions (all) and by type1 and type2 institutions. We report both the average raw trading (Raw Trading) and the abnormal trading (Abn. Trading) as defined in Table 2. Panel B reports the results for the period of 1998-1999 and 2006-2007. In Panel C, each sample firm is assigned into one of the five quintiles based on its cross-sectional ranking during the announcement year of the trading (Q_{-4} - Q_{-1}). For each quintile, we record the post-announcement stock return, from one quarter after the buy-back announcement until eight quarters after. We report the average future returns and t values for the quintile with the lowest (Low) and the highest (High) ranking in pre-announcement trading (Low), and the differences in future returns between these two quintiles (High - Low). The sample period is from January 1985 to December 2008. The reported trading and return figures are in percentage.

Panel A: Prior institutional trading (Q_{-4} - Q_{-1}): Whole sample									
	Low			Medium			High		
	all	type1	type2	all	type1	type2	all	type1	type2
Raw Trading (Q_0)	1.20	0.11	0.99	-0.32	-0.15	-0.18	-2.95	-0.49	-2.40
t-value	8.41	1.83	8.46	-3.07	-3.19	-2.08	-16.13	-5.75	-15.58
Raw Trading (Q_1)	-0.86	-0.30	-0.50	-0.20	-0.19	0.00	0.44	-0.07	0.51
t-value	-6.39	-5.02	-4.41	-1.83	-3.60	-0.03	2.69	-1.00	3.79
Raw Trading (Q_2)	0.16	-0.05	0.22	-0.05	-0.13	0.08	-0.27	-0.15	-0.16
t-value	1.17	-0.94	1.84	-0.45	-2.29	0.82	-1.74	-2.33	-1.23
Raw Trading (Q_0 - Q_2)	0.50	-0.24	0.71	-0.58	-0.46	-0.11	-2.78	-0.72	-2.06
t-value	2.63	-3.18	4.55	-4.00	-7.29	-0.88	-12.24	-7.53	-10.69
Abn. Trading (Q_0)	0.04	-0.07	0.12	-0.82	-0.15	-0.59	-3.08	-0.45	-2.47
t-value	0.17	-0.84	0.68	-4.31	-1.65	-3.81	-13.04	-4.26	-12.29
Abn. Trading (Q_1)	-1.06	-0.27	-0.66	-0.99	-0.3	-0.61	-0.36	-0.06	-0.26
t-value	-5.08	-2.74	-3.68	-5.08	-3.35	-3.8	-1.6	-0.63	-1.42
Abn.Trading (Q_2)	0.01	0.16	-0.17	-0.16	-0.14	-0.04	-0.34	-0.23	-0.14
t-value	0.06	1.54	-0.94	-0.81	-1.58	-0.25	-1.48	-2.22	-0.72
Abn. Trading (Q_0 - Q_2)	-1.01	-0.19	-0.71	-1.97	-0.59	-1.24	-3.78	-0.74	-2.87
t-value	-3.41	-1.58	-2.83	-7.22	-5.23	-5.37	-11.25	-5.29	-10.3

Panel B: Prior institutional trading (Q$_{-4}$ - Q$_{-1}$): Subsample periods

	Low			Medium			High		
	all	type1	type2	all	type1	type2	all	type1	type2
1998 - 1999									
Raw Trading (Q$_0$ - Q$_2$)	-0.24	-0.55	0.46	-2.76	-1.00	-1.79	-7.10	-1.37	-5.96
t-value	-0.45	-3.10	1.06	-6.43	-6.27	-5.01	-12.16	-5.45	-12.50
Abn. Trading (Q$_0$ - Q$_2$)	-1.29	-0.6	-0.27	-2.58	-0.88	-1.27	-6.29	-1.09	-5.05
t-value	-1.68	-2.49	-0.39	-3.52	-2.79	-1.99	-6.78	-2.8	-6.8
2006 - 2007									
Raw Trading (Q$_0$ - Q$_2$)	-1.49	-0.73	-0.49	-0.22	-0.62	0.67	-1.17	-0.22	-0.99
t-value	-1.86	-2.78	-0.74	-0.63	-3.68	1.93	-1.54	-0.76	-1.39
Abn. Trading (Q$_0$ - Q$_2$)	-1.39	-0.16	-1.32	-1.17	-0.22	-0.99	-2.7	-0.84	-1.52
t-value	-1.34	-0.43	-1.48	-1.54	-0.76	-1.39	-2.55	-2.25	-1.62

Panel C: Prior abnormal trading (Q-4 -1) and future returns

	Q$_1$			Q$_2$			Q$_{1-4}$			Q$_{5-8}$		
	Low	High	High - Low	Low	High	High - Low	Low	High	High - Low	Low	High	High - Low
return	4.78	3.15	-1.62	4.61	3.21	-1.4	18.27	13	-5.27	15.18	13.28	-1.9
t value	4.03	2.3	-2.26	3.71	2.72	-1.54	6.96	5.03	-2.76	5.78	5.5	-0.94

Table 6 institutional trading upon buy-back announcement: multivariate regressions

This table reports results from regression analysis of institutional abnormal trading (relative to benchmark as defined in Table 2) upon buy-back announcement and a number of firm characteristics. The repurchase sample selection and the construction of matching firms are discussed in Table 1. We include the following firm characteristics: the trading of all institutions from Q_{-4} to Q_{-1} (Prior trading $(Q_{-4} - Q_{-1})$), and program size, CAR $(-2, +2)$, bm, market cap, prior 6 month returns, IV, xto, and analyst coverage, as defined in Table 3. Each of these characteristics takes a value 0, 1, or 2 based on the sample firm's tercile ranking on each characteristic during the announcement year. We then regress the post-announcement abnormal trading (Q_0, and $(Q_0 - Q_2)$) on these ranked characteristics across all sample firms and time. Panel A report the regression results where the dependent variable is the trading by all institutions. Panel B reports results where the dependent variable is the trading by type 2 institutions. The sample is from January 1985 to December 2008.

Dependent variable			Intercept	Prior trading $(Q_{-4} - Q_{-1})$	Program size	CAR $(-2, +2)$	bm	Market cap	Prior 6-month return	IV	xto	Analyst coverage	Adj R^2
Panel A:													
Trading	Q_0	parameter	0.0106	-0.0160	-0.0067	0.0046	0.0006	-0.0011	0.0054	-0.0061	-0.0010	-0.0041	0.02
(all)		t value	1.65	-9.15	-3.68	2.54	0.31	-0.35	2.95	-2.63	-0.46	-1.61	
	$Q_0 - Q_2$	parameter	-0.0042	-0.0143	-0.0100	0.0038	0.0008	0.0027	0.0081	-0.0019	-0.0056	-0.0013	0.01
		t value	-0.45	-5.70	-3.81	1.46	0.26	0.61	3.09	-0.56	-1.78	-0.35	
Panel B:													
Trading	Q_0	parameter	0.0074	-0.0130	-0.0036	0.0027	0.0015	-0.0008	0.0037	-0.0055	-0.0010	-0.0023	0.01
(type 2)		t value	1.39	-8.95	-2.36	1.79	0.88	-0.30	2.42	-2.85	-0.56	-1.09	
	$Q_0 - Q_2$	parameter	-0.0010	-0.0112	-0.0067	0.0024	0.0025	-0.0003	0.0039	-0.0024	-0.0039	0.0018	0.01
		t value	-0.13	-5.34	-3.08	1.09	1.06	-0.08	1.77	-0.88	-1.48	0.60	

Table 7: returns of buy-back firms following institutional trading

This table reports returns on stocks following institutional trading on buy-back announcement. The repurchase sample selection and the construction of matching firms are discussed in Table 1. Every quarter we rank all buy-back firms into quintiles based on their institutional trading during the announcement quarter. We examine separately the returns for the quintile with the most increase in institutional ownership (top increase in IO), and those with the most decrease in institutional ownership (top decrease in IO), up to 8 quarters following the ranking quarter. For both quintiles, we report the average return in excess of the market return for the sample firms, as well as those for the matched firms, as well as the difference between the two. We also report the average difference in excess returns between these two quintile portfolios. Panel A reports the results for all institutions. Panel B and C report results for passive institutions (type 1), and active institutions (type 2), respectively. The sample period is from January 1985 to December 2008. The returns are in percentage.

		Top Increase in IO			Top decrease in IO			Inc - Dec
		sample	matched	Diff	sample	matched	Diff	(sample)
Panel A: all institutions								
Quarter 1	return	4.48	3.89	0.59	4.60	3.61	0.99	-0.12
	t-value	3.78	2.79	0.66	3.54	2.53	1.01	-0.13
Quarter 2	return	4.60	2.89	1.70	2.55	4.13	-1.58	2.05
	t-value	4.21	2.14	2.01	2.28	3.14	-1.99	2.68
Quarters 3 - 4	return	8.82	6.81	2.12	9.41	6.36	3.26	-0.58
	t-value	4.85	3.43	1.63	4.81	3.30	2.68	-0.52
Quarters 5 - 8	return	14.45	14.15	-0.52	14.39	16.24	-1.18	0.06
	t-value	5.92	4.62	-0.21	5.96	4.76	-0.50	0.04
Panel B: type1 institutions								
Quarter 1	return	3.47	2.68	0.80	4.77	2.58	2.19	-1.30
	t-value	2.80	1.93	0.98	4.32	2.07	3.26	-1.80
Quarter 2	return	3.97	3.72	0.25	3.22	4.45	-1.23	0.75
	t-value	3.59	2.89	0.31	3.02	3.49	-1.68	1.08
Quarters 3 - 4	return	7.84	5.99	1.90	9.49	9.51	-0.06	-1.65
	t-value	4.48	3.11	1.57	4.83	4.18	-0.04	-1.43
Quarter 5 - 8	return	15.64	20.83	-5.46	14.09	15.45	-1.37	1.55
	t-value	6.43	3.94	-1.08	6.41	5.32	-0.61	0.87

Table 7 (*continued*)

		Top Increase in IO				Top decrease in IO			Inc - Dec
		sample	matched	Diff		sample	matched	Diff	(sample)
Panel C: type 2 institutions									
Quarter 1	return	4.50	3.00	1.49		4.21	3.72	0.48	0.29
	t-value	3.98	2.21	1.80		3.01	2.66	0.43	0.31
Quarter 2	return	4.41	2.68	1.74		1.98	3.59	-1.62	2.44
	t-value	3.79	1.93	2.08		1.71	2.53	-2.12	3.50
Quarters 3 - 4	return	8.00	6.68	1.40		8.88	7.26	1.62	-0.88
	t-value	4.53	3.02	1.03		4.63	3.56	1.31	-0.86
Quarters 5 - 8	return	13.96	13.29	0.37		14.81	16.75	-1.32	-0.86
	t-value	5.79	4.62	0.16		6.31	4.73	-0.56	-0.53

Table 8: returns on buy-back firms following institutional trading conditional on firm characteristics

This table reports returns on stocks following institutional trading on buy-back announcement. The repurchase sample selection and the construction of matching firms are discussed in Table 1.We split the sample into halves based on the sample firms' ranking of various firm characteristics during the announcement year. Within each half sample, we rank all buy-back firms into quintiles based on their abnormal institutional trading during the announcement quarter. We examine separately the returns for the quintile with the most increase in institutional ownership (top increase in IO), and those with the most decrease in institutional ownership (top decrease in IO), up to 8 quarters following the ranking quarter. For both quintiles, we report the average excess returns for the sample firms, as well as the difference between the sample firm and the matched firm (as defined in Table 3). We report the results for all institutions, passive institutions (type 1), and active institutions (type 2), respectively. We report results for the following firm characteristics as defined in Table 3: market cap, bm, prior six-month return, and iv. The sample period is from January 1985 to December 2008. The returns are in percentage.

		All institutions					Type 1 institutions					Type 2 institutions				
		Top increase in IO		Top decrease in IO		Inc - Dec	Top increase in IO		Top decrease in IO		Inc - Dec	Top increase in IO		Top decrease in IO		Inc - Dec
		sample	diff	Sample	diff	(sample)	sample	diff	Sample	diff	(sample)	sample	diff	Sample	diff	(sample)
Panel A1: market capitalization (large)																
Q_1	return	2.70	-0.96	5.17	2.50	-2.46	2.72	0.70	4.54	2.31	-1.82	3.57	0.78	5.09	2.07	-1.53
	t-value	2.33	-0.87	3.71	2.22	-2.18	2.09	0.69	4.31	2.53	-1.88	3.10	0.69	3.33	1.65	-1.29
Q_2	return	3.96	0.16	3.93	-0.54	0.03	4.06	-0.13	4.67	-0.18	-0.60	3.67	-0.76	3.31	-1.29	0.36
	t-value	3.67	0.13	3.34	-0.53	0.04	3.54	-0.12	4.34	-0.17	-0.66	3.15	-0.56	2.73	-1.16	0.39
Q_{3-4}	return	9.46	2.19	9.30	4.13	0.16	7.24	0.28	8.07	1.91	-0.83	9.21	2.58	8.92	1.22	0.29
	t-value	5.38	1.69	4.88	3.02	0.11	4.22	0.19	4.28	1.41	-0.62	5.11	1.65	4.73	0.65	0.19
Q_{5-8}	return	15.10	0.37	15.08	-3.74	0.09	16.70	-1.83	12.37	-3.66	4.33	14.36	1.47	16.80	-1.64	-2.44
	t-value	5.69	0.15	6.50	-1.06	0.04	6.57	-0.64	5.45	-1.25	1.79	5.69	0.53	6.94	-0.49	-1.16
Panel A2: market capitalization (small)																
Q_1	return	6.19	2.32	4.25	-0.33	1.93	4.40	-1.75	4.67	0.92	-0.26	5.63	1.26	3.36	-2.08	2.27
	t-value	4.13	1.63	2.80	-0.23	1.35	3.12	-1.28	3.13	0.74	-0.19	3.92	0.98	2.31	-1.34	1.77
Q_2	return	6.22	4.95	1.48	-2.28	4.74	5.07	0.51	2.28	-3.30	2.79	5.34	3.95	1.82	-1.29	3.52
	t-value	4.31	3.99	1.16	-1.96	4.04	3.86	0.40	1.62	-2.48	2.30	3.80	3.06	1.42	-1.12	3.21
Q_{3-4}	return	7.42	3.06	10.44	2.78	-3.02	7.16	3.83	10.75	-2.60	-3.59	7.72	-1.37	9.42	1.60	-1.70
	t-value	3.41	1.35	4.21	1.41	-1.77	3.31	2.14	4.45	-0.79	-1.90	3.78	-0.40	3.77	0.78	-0.97
Q_{5-8}	return	15.41	0.37	13.60	-0.11	1.97	14.05	-8.38	15.74	1.57	-1.77	14.45	-0.76	14.07	0.59	0.73
	t-value	4.79	0.08	4.41	-0.03	0.65	5.22	-0.93	4.51	0.47	-0.52	4.45	-0.18	4.80	0.17	0.27

Table 8 (*Continued*)

| | | All institutions | | | | | Type 1 institutions | | | | | Type 2 institutions | | | | |
| | | Top increase in IO | | Top decrease in IO | | Inc - Dec | Top increase in IO | | Top decrease in IO | | Inc - Dec | Top increase in IO | | Top decrease in IO | | Inc - Dec |
		sample	diff	Sample	diff	(sample)	sample	diff	Sample	diff	(sample)	sample	diff	Sample	diff	(sample)
Panel B1: bm (high)																
Q_1	return	6.10	1.78	5.62	0.98	0.48	5.84	2.27	5.13	2.82	0.71	5.33	2.27	4.97	0.78	0.36
	t-value	4.66	1.47	3.75	0.77	0.40	4.18	1.99	3.74	2.85	0.64	4.34	2.13	3.34	0.56	0.29
Q_2	return	4.01	1.67	2.73	-1.35	1.28	3.01	-0.06	3.76	-0.50	-0.76	4.50	2.22	1.98	-0.73	2.52
	t-value	3.43	1.62	2.53	-1.46	1.33	2.77	-0.06	3.27	-0.50	-0.96	3.62	2.24	1.94	-0.74	2.79
Q_{3-4}	return	8.61	1.79	9.16	1.96	-0.55	7.33	2.05	9.89	-0.48	-2.56	8.22	-0.24	7.95	0.34	0.27
	t-value	4.34	1.11	4.29	1.09	-0.41	3.68	1.29	4.49	-0.23	-1.68	3.93	-0.10	3.69	0.18	0.17
Q_{5-8}	return	14.90	1.11	14.05	-3.14	0.85	15.17	-2.07	14.95	-2.68	0.22	14.41	-0.18	15.04	0.51	-0.63
	t-value	5.39	0.35	4.88	-1.11	0.35	5.15	-0.55	5.50	-1.08	0.09	5.24	-0.06	5.04	0.15	-0.24
Panel B2: bm (low)																
Q_1	return	2.64	-0.93	4.11	1.48	-1.48	0.78	-1.61	4.30	1.82	-3.53	3.71	-0.11	3.79	1.27	-0.08
	t-value	2.05	-0.64	2.74	1.27	-1.18	0.56	-1.32	3.98	1.67	-3.84	2.83	-0.08	2.36	1.01	-0.06
Q_2	return	4.68	1.98	2.87	-2.03	1.81	5.66	1.46	2.95	-1.99	2.71	3.31	0.69	2.86	-1.84	0.45
	t-value	3.28	1.38	2.12	-1.51	1.31	3.91	1.14	2.43	-1.56	1.97	2.61	0.48	2.12	-1.41	0.38
Q_{3-4}	return	7.55	1.23	8.66	4.37	-1.10	5.71	-0.80	8.97	1.34	-3.25	8.23	2.04	8.50	2.08	-0.26
	t-value	3.75	0.49	3.76	2.17	-0.54	2.98	-0.42	3.88	0.77	-1.55	4.03	0.95	3.79	0.91	-0.13
Q_{5-8}	return	11.62	0.65	15.06	2.50	-3.44	12.42	-11.1	12.84	-0.78	-0.42	10.69	0.85	16.15	2.93	-5.46
	t-value	3.79	0.19	5.89	0.71	-1.26	4.34	-1.26	5.01	-0.24	-0.14	3.24	0.28	6.02	0.75	-1.85
Panel C1: prior six-month return (high)																
Q_1	return	3.97	0.25	4.89	1.16	-0.93	3.67	0.45	5.49	3.33	-1.82	4.30	1.49	4.51	0.81	-0.21
	t-value	3.27	0.21	3.94	0.94	-0.80	2.99	0.36	4.79	3.15	-1.79	3.84	1.25	3.25	0.64	-0.18
Q_2	return	3.49	-0.84	3.50	-0.87	-0.01	3.90	-0.03	3.12	-2.37	0.78	3.83	-0.36	2.07	-1.36	1.76
	t-value	2.97	-0.54	3.03	-0.71	-0.01	3.38	-0.02	2.80	-1.86	0.89	3.32	-0.28	1.81	-1.49	2.03
Q_{3-4}	return	7.14	1.80	10.28	3.52	-3.14	7.10	1.80	9.95	-1.22	-2.85	7.20	-0.58	9.62	1.21	-2.43
	t-value	3.49	1.10	5.17	2.40	-2.00	3.91	1.03	4.96	-0.52	-1.77	4.01	-0.27	4.64	0.61	-1.50
Q_{5-8}	return	15.36	2.50	13.80	-1.78	1.68	16.40	-9.31	11.87	-3.05	4.67	13.56	-0.35	14.49	-0.75	-0.71
	t-value	5.35	0.67	5.01	-0.51	0.62	6.15	-1.22	4.98	-1.16	1.83	5.22	-0.10	5.05	-0.22	-0.26

Table 8 (*continued*)

| | | All institutions | | | | | Type 1 institutions | | | | | Type 2 institutions | | | | |
| | | Top increase in IO | | Top decrease in IO | | Inc - Dec | Top increase in IO | | Top decrease in IO | | Inc - Dec | Top increase in IO | | Top decrease in IO | | Inc - Dec |
		sample	diff	Sample	diff	(sample)	sample	diff	Sample	diff	(sample)	sample	diff	Sample	diff	(sample)
Panel C2: prior six-month return (low)																
Q_1	return	5.07	0.71	4.28	0.63	0.82	3.62	0.10	4.76	1.97	-1.12	5.89	0.76	3.58	0.17	2.46
	t-value	3.22	0.48	2.33	0.46	0.55	2.34	0.06	3.37	1.56	-0.88	3.59	0.33	1.92	0.12	1.63
Q_2	return	4.98	3.65	1.72	-2.86	3.04	4.28	2.09	3.14	0.32	0.91	5.12	5.19	1.54	-2.78	3.66
	t-value	3.37	2.88	1.16	-2.06	2.14	2.98	1.38	2.20	0.25	0.68	3.27	3.89	1.06	-2.14	2.42
Q_{3-4}	return	10.66	4.03	9.64	4.69	1.12	7.48	2.67	10.98	2.95	-3.43	10.61	5.34	7.97	2.27	2.14
	t-value	4.71	2.09	3.61	2.02	0.56	3.65	1.21	3.84	1.28	-1.73	4.29	2.25	3.02	0.98	1.01
Q_{5-8}	return	13.64	2.92	17.04	-2.71	-2.95	15.77	-2.35	17.05	0.90	-0.61	13.33	2.64	16.02	-1.88	-2.03
	t-value	3.88	0.85	5.07	-0.83	-0.79	5.17	-0.44	5.40	0.27	-0.18	4.03	0.68	5.73	-0.55	-0.71
Panel D1: iv (high)																
Q_1	return	4.65	1.22	3.28	-0.64	1.37	2.09	-0.95	4.85	2.83	-2.76	4.05	1.45	2.51	-2.80	1.54
	t-value	2.96	0.87	1.94	-0.49	1.11	1.33	-0.77	3.12	2.30	-2.48	2.62	1.11	1.43	-2.33	1.11
Q_2	return	4.15	1.96	2.62	-0.52	1.54	5.57	1.30	2.20	-1.77	3.37	3.36	2.02	2.63	-0.10	0.73
	t-value	2.72	1.50	1.66	-0.43	1.20	3.71	0.97	1.39	-1.30	2.81	2.17	1.48	1.80	-0.10	0.58
Q_{3-4}	return	8.67	2.79	10.15	5.66	-1.48	6.68	2.46	12.98	4.46	-6.30	8.41	2.16	9.33	3.90	-0.92
	t-value	3.94	1.19	3.83	2.67	-0.76	3.27	1.33	4.86	1.99	-3.11	3.86	0.99	3.54	1.90	-0.43
Q_{5-8}	return	14.63	-1.55	16.16	0.62	-1.52	18.96	-5.52	16.90	5.69	2.16	15.10	0.19	16.22	-1.17	-1.00
	t-value	4.07	-0.30	4.68	0.14	-0.48	5.36	-0.55	3.91	1.22	0.50	3.85	0.04	5.21	-0.27	-0.31
Panel D2: iv (low)																
Q_1	return	2.91	-0.41	3.91	0.97	-1.00	3.30	1.22	3.38	0.81	-0.09	3.57	0.35	4.48	1.37	-0.91
	t-value	3.16	-0.42	4.00	0.95	-1.23	3.61	1.40	3.70	0.93	-0.13	3.83	0.35	4.56	1.28	-1.20
Q_2	return	3.83	0.30	2.80	-3.47	1.02	3.45	0.11	3.69	-1.63	-0.24	3.88	-0.08	2.62	-2.58	1.26
	t-value	3.59	0.28	2.97	-2.48	1.32	3.43	0.11	3.67	-1.40	-0.31	3.93	-0.07	2.77	-1.75	1.64
Q_{3-4}	return	7.24	0.55	7.46	0.18	-0.22	7.53	0.82	7.78	-0.55	-0.26	6.69	-0.91	8.23	-0.80	-1.54
	t-value	4.30	0.39	4.66	0.11	-0.17	4.51	0.70	4.98	-0.27	-0.24	4.22	-0.46	4.95	-0.46	-1.38
Q_{5-8}	return	13.98	1.13	13.65	-1.61	0.33	13.32	-0.74	11.85	-3.70	1.47	13.21	1.60	15.01	0.58	-1.80
	t-value	6.18	0.35	6.59	-0.59	0.21	5.73	-0.30	6.26	-1.58	1.01	6.25	0.63	6.54	0.23	-0.97

Table 9: expected and residual returns of buy-back firms following institutional trading

This table reports expected and residual returns on sample stocks following institutional trading on buy-back announcement. The repurchase sample selection and the construction of matching firms are discussed in Table 1. We decompose stock returns into the expected part and the residual part. Specifically, each quarter we run the following cross-sectional regressions across all firms that do not make repurchase announcement from 8 quarters before until 8 quarters after the current quarter:

$$R_{Q1}(R_{Q2}) = \text{intercept} + \Delta IO + \text{market cap} + bm + \text{past return},$$

where $R_{Q1}(R_{Q2})$ is the quarterly stock return in excess of the market return for the first (second) quarter following the announcement quarter. ΔIO is the total institutional trading during the announcement quarter. Market cap, bm, and past return are the market capitalization, book-to-market ratio, and past 12-month return available at announcement quarter. To obtain the expected returns for sample firms (R_{exp}), each quarter we multiply the realizations of ΔIO, market cap, bm, and past return for sample firms by the estimated coefficients from the above regression. The residual return (R_{res}) is calculated as the difference between the market excess return and the expected return. Every quarter we rank all buy-back firms into quintiles based on their institutional trading during the announcement quarter. We examine both R_{exp} and R_{res} for the quintile with the most increase in institutional ownership (top increase in IO), and those with the most decrease in institutional ownership (top decrease in IO), up to 2 quarters following the ranking quarter. We also report the average difference in R_{exp} and R_{res} between these two quintile portfolios. Panel A reports the results for all institutions. Panel B and C report results for passive institutions (type 1), and active institutions (type 2), respectively. The sample period is from January 1985 to December 2008. The returns are in percentage.

Table 9 (*Continued*)

		Top Increase in IO		Top Decrease in IO		Inc-Dec	
		R_{exp}	R_{res}	R_{exp}	R_{res}	R_{exp}	R_{res}
Panel A: all institutions							
Quarter 1	return	3.13	1.35	3.36	1.24	-0.23	0.11
	t-value	2.76	1.95	2.85	1.78	-1.26	0.13
Quarter 2	return	3.72	0.89	3.51	-0.95	0.21	1.84
	t-value	3.12	1.42	2.89	-1.58	0.9	2.42
Panel B: type1 institutions							
Quarter 1	return	3.26	0.22	3.47	1.30	-0.21	-1.09
	t-value	2.81	0.35	2.88	2.05	-1.11	-1.53
Quarter 2	return	3.42	0.55	3.64	-0.42	-0.22	0.96
	t-value	2.89	0.84	3.04	-0.6	-1.11	1.39
Panel C: type2 institutions							
Quarter 1	return	3.04	1.46	3.34	0.86	-0.30	0.59
	t-value	2.72	2.3	2.79	1.22	-1.28	0.7
Quarter 2	return	3.79	0.62	3.49	-1.51	0.31	2.13
	t-value	3.17	0.89	2.84	-2.63	1.18	2.82

Table 10: institutional (daily) trading upon buy-back announcement, and stock return predictability

This table reports the aggregate net institutional trading around the buy-back announcement and future stock returns. The daily net trading is obtained by aggregating the daily trades of all institutional clients of Abel/Noser Corp's for any trading day. In Panel A, we report the average trading across stocks from 30 days before the buy-back announcement till 30 days after with varying windows. In addition we report the trading from the beginning of the announcement quarter to the day prior to the announcement date (QtrBgn , -1), and that from the announcement date to the end of the announcement quarter (0, QtrEnd). In Panel B we report the average institutional trading for stocks with low, medium, and high buy-back announcement returns based their CAR ranking during the announcement year. The event windows for announcement returns are 5-day (CAR(-2,+2)) and 11-day (CAR (-5, +5)), respectively; and the correlating trading dates are (+3, 10) and (+6, 10), respectively. We next sort the sample firms with daily trading data into quintile portfolios based on their five-day trading upon buy-back announcement, and hold each portfolio for up to 12 months. We then examine the returns (in excess of the market return) for the portfolio with the most increase in institutional ownership (top increase in IO) and those with the most decrease in institutional ownership (top decrease in IO), as well as the return difference between these two portfolios. Panel C reports the average returns across sample firms and event months. The sample period is from January 1999 to December 2008. The returns are in percentage.

Panel A: institutional daily trading around buy-back announcement

				event dates			
	(QtrBgn , -1)	(-30, -1)	(-5, -1)	(-1, 1)	(0, 5)	(0, 30)	(0, QtrEnd)
trading	-0.02	-0.01	-0.01	-0.01	-0.02	-0.04	-0.06
t-value	-0.87	-0.61	-1.48	-1.76	-2.44	-2.02	-2.73

Panel B: institutional daily trading around buy-back announcement: conditional announcement returns

	event dates (+3, 10)				event dates (+6, 10)		
	CAR(-2,+2) low	CAR(-2,+2) medium	CAR(-2,+2) high		CAR(-5,+5) low	CAR(-5,+5) medium	CAR(-5,+5) high
trading	-0.03	-0.02	0.00		-0.03	-0.01	0.01
t-value	-2.01	-1.37	0.12		-1.97	-1.15	0.94

Panel C: future stock returns following institutional 5-day trading upon buy-back announcement

		month 1	month 2	months 1 - 3	months 4 - 6	months 7-9	months 10 -12
Top increase in IO	return	1.24	1.61	3.84	0.83	1.64	2.44
	t-value	3.08	4.07	5.02	1.16	2.14	3.07
Top decrease in IO	return	0.94	0.20	2.06	1.09	2.48	1.35
	t-value	2.29	0.52	3.21	1.61	3.24	1.81
Diff (Inc - Dec)	return	0.30	1.41	1.78	-0.26	-0.84	1.09
	t-value	0.53	2.58	1.78	-0.27	-0.78	1.00